

A dedicated SiPMs array for GRD of GECAM

Monday, 16 August 2021 14:20 (15 minutes)

The discovery of gravitational waves and their gamma bursts has opened the era of multi messenger astronomy. China's Gravitational wave high energy Electromagnetic Counterpart All-sky Monitor (GECAM) uses two small satellites to monitor gamma-ray bursts in an all-sky field of view. It has a quasi-real-time gamma burst broadcast capability and will play an important role in the location of gravitational wave sources and subsequent observations. Each GECAM small satellite is equipped with 25 3-inch diameter gamma ray detectors (GRD), which can cover 8 keV-2 MeV. GRD uses SiPMs instead of PMT to adapt to the size constraints of micro-satellite platforms, and uses high light yield lanthanum bromide crystals to lower the threshold to 8 keV. A unique 3-inch circular SiPMs array has been designed, using 64 6x6 mm chip units, uniformly arranged in a circular shape, filled with reflective film in the gap, and good uniformity of light collection is obtained; the back of the SiPMs array integrates a front amplifier circuit, two-stage grouping summation is adopted to obtain a good signal-to-noise ratio; two channels readout with high and low gain is adopted to achieve a large dynamic range; two groups of independent power supplies are used, and each group can be turned off separately, which improves reliability. This presentation will introduce the status of GECAM and then focus on the SiPMs array, includes its design and performance.

Primary author: Mr 孙, 希磊 (IHEP)

Co-authors: ZHANG DALI; 安, 正华 (高能所)

Presenter: Mr 孙, 希磊 (IHEP)

Session Classification: Parallel Session V: Particle Detector Technology

Track Classification: 5. 粒子物理实验技术